

First records of *Hypsiglena torquata* (Günther, 1860) (Serpentes, Dipsadidae) from María Madre Island, Nayarit, Mexico

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Abstract. The occurrence of *Hypsiglena torquata* (Günther, 1860), Night Snake, on María Madre Island, which is part of the Islas Marías Archipelago Biosphere Reserve on the Pacific coast of Mexico, is confirmed through the examination of squamation. This record increases the herpetofaunal diversity of María Madre Island, the largest of the island in the Gulf of California, to 24 species: four amphibians and 20 reptiles. In addition, we provide an updated list of the herpetofauna of María Madre Island.

Key words. Islas Marías Biosphere Reserve, morphology, Pacific Ocean, reptiles, taxonomy

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INTRODUCTION

The Night Snake, *Hypsiglena torquata* (Günther, 1860), a species endemic to Mexico, is widely distributed along the Pacific slope of the country from Sinaloa to Guerrero (Mulcahy et al. 2014). There are some records from island populations in the insular region of Nayarit. Specifically, this species occurs in Marietas Islands, Isla del Coral, and María Magdalena Island (Castro-Franco and Gaviño 1990; Casas-Andreu 1992; Woolrich-Piña et al. 2016; Nolasco-Luna et al. 2022). *Hypsiglena torquata* is a medium-sized snake having a snout–vent length reaching 460 mm, with a tail approximately 20% of the body length (Tanner 1944; Canseco and Gutiérrez 2010). It is an oviparous species with terrestrial and nocturnal habits (Canseco and Gutiérrez 2010). During the day, it is usually found sheltered under rocks. Its diet consists of small toads and various species of frogs, small lizards, eggs, sometimes snakes, and even arthropods (Tanner 1944; Rodríguez-Robles et al. 1999). *Hypsiglena torquata* has been given the status of requiring Special Protection under NOM-059 (SEMARNAT 2010). This species was assessed as Least Concern by the International Union for the Conservation of Nature (IUCN 2007), and Wilson et al. (2013) gave it a low environmental vulnerability score (EVS = 8).

Despite efforts in the last two decades to know the alpha diversity of the Islas Marías Archipelago (e.g. De la Torre et al. 2010; Nolasco-Luna et al. 2022), there is only one record of *H. torquata* from the archipelago. The specimen was collected by James R. Northern and Roy R. Snelling on the María Magdalena Island (McDiarmid et al. 1976). It was a female collected on 23 March 1964 and deposited in the Los Angeles County Museum of Natural History (LACM 25247). Here, we report the first records of *H. torquata* from María Madre Island, which represents the second time this species from the Islas Marías Archipelago.



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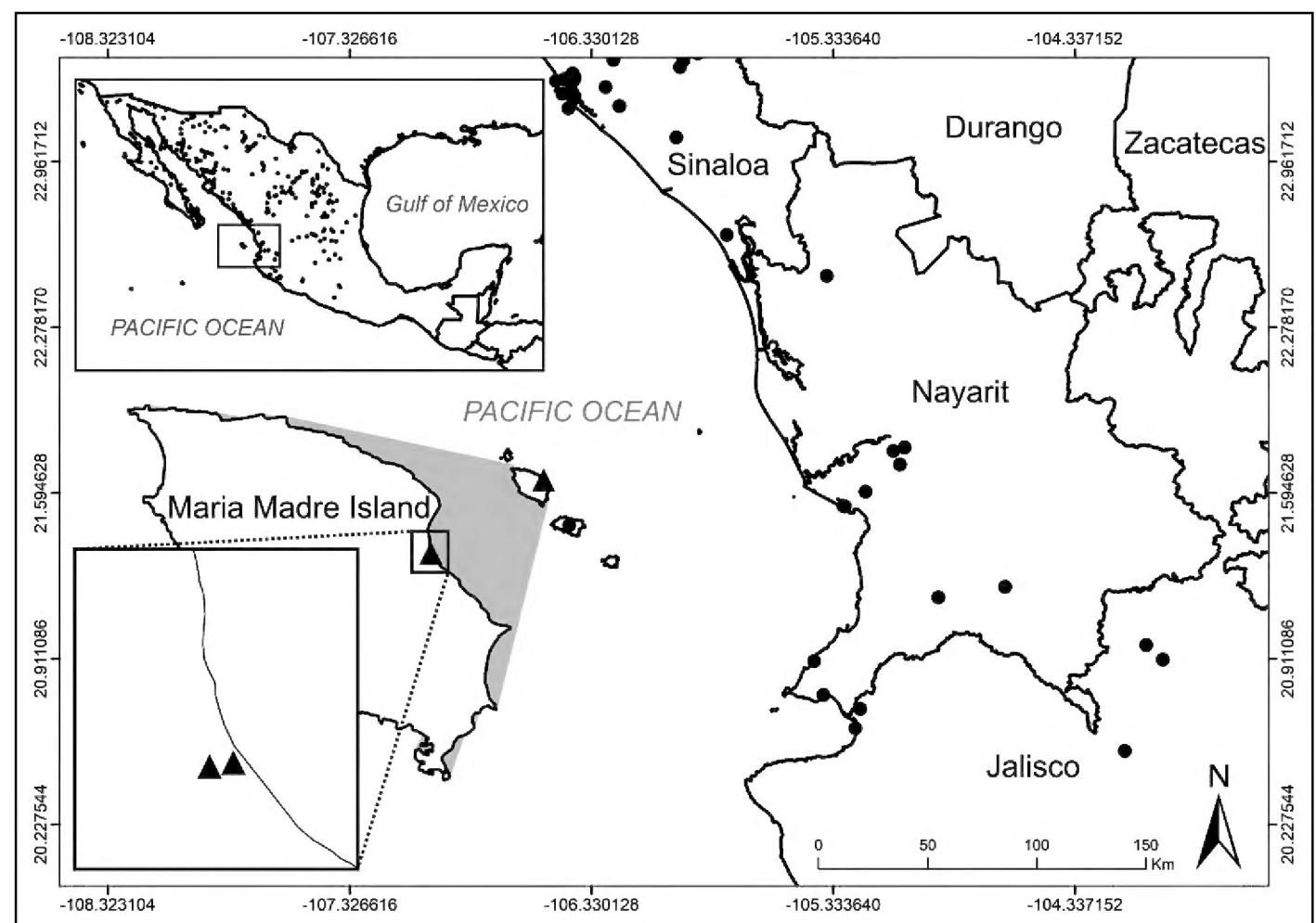
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METHODS

María Madre Island, having an area of 144 km², is located in Pacific Mexico off the coast of Nayarit (Figure 1). This is the largest island in the Islas Marías Archipelago Biosphere Reserve (CONANP 2022). The terrestrial relief of the island includes two peaks with a west–east orientation, reaching a height of up to 640 m. The island is 98 km from the nearest point on the continent (Casas-Andreu 1992; CONANP 2022). The island has four main types of vegetation: medium subdeciduous forest, low deciduous forest, crasicaule scrub with low thorny forest, and coastal dune association (Casas-Andreu 1992; CONANP 2022).

Figure 1. Map showing the new records of *Hypsiglena torquata* from the María Madre Island, Nayarit, Mexico. Black circles on mainland showed the previous records of the study species (GBIF Secretariat 2023).



We visited María Madre Island on 22–26 April 2021. We conducted *ad libitum* surveys in diurnal (09:00 to 17:00 h) and nocturnal (19:00 to 03:00 h) periods. On 22 April 2021, we captured and photographed two individuals of *H. torquata* that were observed on the periphery of the residential area on the island. A photograph of each organism was deposited in the photo library of the National Collection of Amphibians and Reptiles of the Universidad Nacional Autónoma de México (IBH–RF). We identified the snake species using the identification key by Pérez-Higareda et al. (2007). Description of the coloration and squamation was based on Tanner (1944) and McDiarmid et al. (1976). We also sought consultation from two Mexican herpetologists regarding the snake's identity. Squamation details were obtained following the methodology described by Pérez-Higareda et al. (2007). In addition, we measured four meristic characters: snout–vent length (SVL), from the tip of the snout to the anterior margin of the cloaca; tail length (TL), from the cloaca to the tip of the tail; head length (HL), from the tip of the snout to the posterior edge of the maxillary bone; and head width (HW), measured at the widest point of head.

RESULTS

Hypsiglena torquata (Günther, 1860)

Figures 2, 3

Material examined. MEXICO – NAYARIT • María Madre Island; 21.6316°N, 106.5383°W; < 5 m elev.; 22.IV.2021; Miguel Roman obs.; sex indet., IBH–RF–974 • María Madre Island; 21.6317°N, 106.5371°W; < 5 m elev.; 22.IV.2021; Armando H. Escobedo Galván obs.; sex indet., IBH–RF–975.

The first snake was found during a nocturnal survey resting on the ground, under a fallen tree trunk, at approximately 21:00 h. Its SVL is 253 mm; the TL is 57 mm, and the relative tail length (TL/SVL) is 0.22. The HL and HW are 9.95 mm and 6.64 mm, respectively. The second individual was detected during the same survey at approximately 22:00 h under a garbage dump. The SVL is 232 mm; the TL is 44 mm, with a relative tail length of 0.19. The HL is 10.52 mm, and the HW is 6.40 mm.

Identification. The captured individuals were identified using the taxonomic keys by Pérez-Higareda et al. (2007) and Tanner (1944). The distinguishing characteristics are as follows: the head is brown, tending to be long and wide, with a dark brown postocular band originating behind the eye. On the back of the head, there is a white nuchal collar covering approximately four rows of scales, followed by a broad dark brown band covering seven to nine rows of scales. The body is moderately thick and tapers towards the tail. Along the midline of the back, there is a series of dark spots with variable shapes (quadrangular, rounded, or irregular), with other smaller and rounded spots on the sides. Ventrally, the body is yellowish cream in color. The scutellation of the individuals is as follows: for the first individual, 181 ventrals, 52 subcaudals, 8–8 supralabials, 9–8 infralabials, 2 preoculars, and 2 postoculars; for the second individual, 172 ventrals, 50 subcaudals, 8–8 supralabials, 9–8 infralabials, 2 preoculars, and 2 postoculars (Table 1).

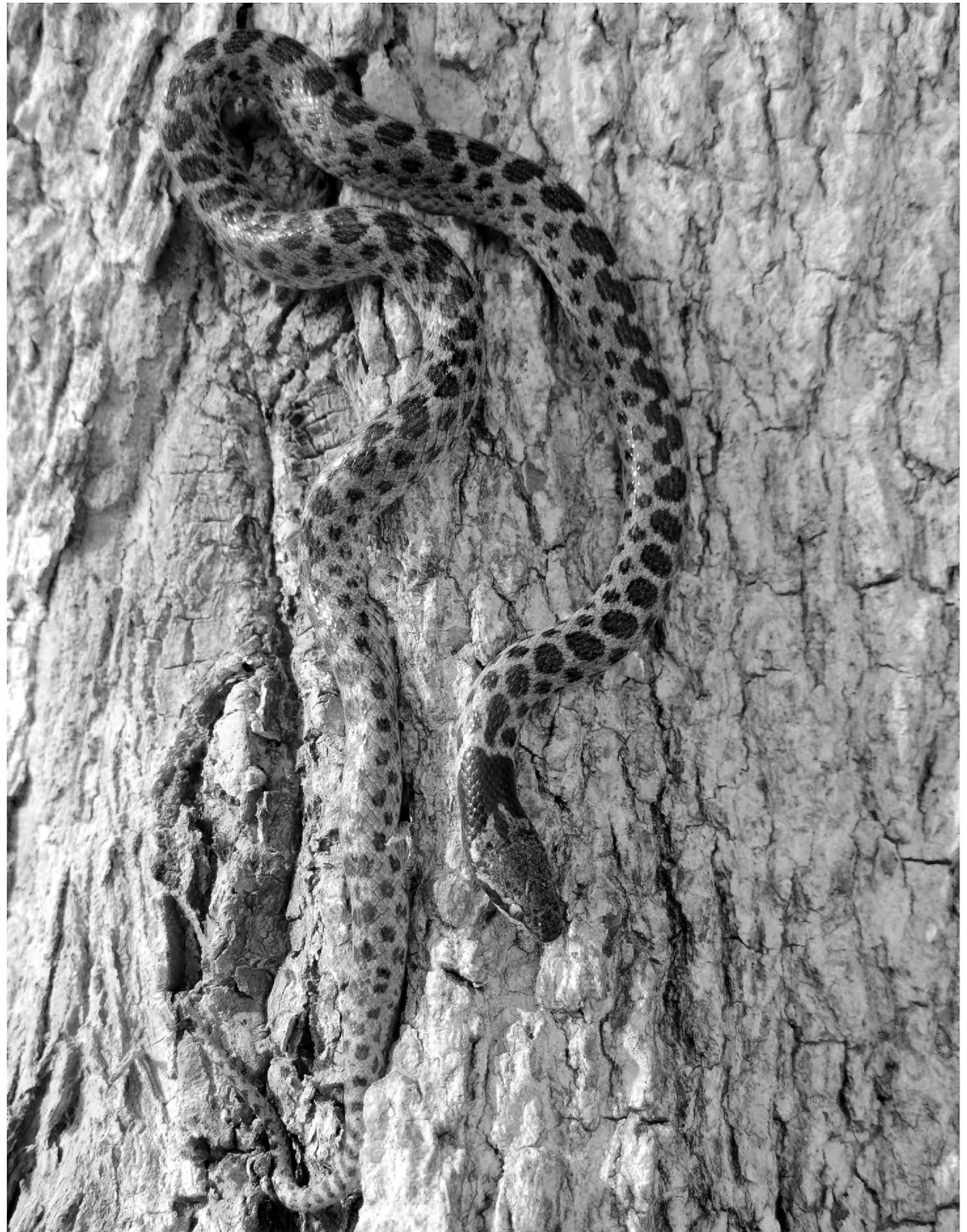


Figure 2. Dorsal view of the first individual of *Hypsiglena torquata* found on María Madre Island, Nayarit.



Figure 3. Second specimen of *Hypsiglena torquata* collected on María Madre Island, Nayarit.

Table 1. Comparison of *Hypsiglena torquata* captured snake from María Madre Island and María Magdalena Island based on morphological characters.

Character	This study	McDiarmid et al. 1976
Individuals analyzed (<i>n</i>)	2	1
Tail length/total length (%)	0.19–0.22	0.17
Ventrals	172–181	179
Subcaudals	50–52	44
Ventrals + Subcaudals	222–233	223
Postoculars	2	2–3
Preocular	2	1
Supralabials	8	8
Infralabials	8–9	10

DISCUSSION

To our knowledge, the previous record of *Hypsiglena torquata* in the Islas Marías Archipelago was described by McDiarmid et al. (1976). In their report, these authors observed that their specimen from María Magdalena Island is more similar to individuals of the same species from Sinaloa than those from Nayarit, both in coloration patterns and scale counts. Specifically, they observed that the specimen from María Magdalena Island presented 222 ventral + subcaudal scales, which is within the range of the Sinaloa specimens with 210–229 ventral + subcaudal scales (average of 220 scales), and it is outside the range of the Nayarit organisms (average of 212 scales, ranging from 208 to 219 scales) (McDiarmid et al. 1976). One of our specimens from María Madre Island (222 scales) is within the scale count described for *H. torquata* from Sinaloa, but the other individual (233 scales) is above the range of scale counts reported by McDiarmid et al. (1976). Dixon and Dean (1986) observed that mainland populations of *H. torquata* from Guerrero to Sonora present an increase in their ventral + subcaudal scales. *Hypsiglena torquata* has been documented on islands other than the Islas Marías, such as Isla del Coral, and Islas Marietas (Casas-Andreu 1992, Rodríguez Malagón et al. 2012), and, therefore, a future study that considers both island and continental populations might better our understanding the clinal trends in body size and ventral + subcaudal scales of *Hypsiglena* species (Lee et al. 2016).

The occurrence of *H. torquata* on both the María Madre and María Magdalena islands might support the hypotheses that organisms from the Sinaloa region were part of the colonization of the Islas Marías Archipelago after the formation of the Gulf of California. Zweifel (1960) first proposed that some species of the Islas Marías could migrate from mainland populations in Sinaloa, despite the proximity to Nayarit. Ramírez-Reyes et al. (2021) showed that *Phyllodactylus cleofasensis* Ramírez-Reyes, Barraza-Soltero, Nolasco-Luna, Flores-Villela & Escobedo-Galván, 2021 diverged from mainland populations about 7 Ma ago, and its sister species are located in southern Sinaloa. García-Navarrete et al. (2024) recently found that the faunal communities on the Islas Marías assembled through vicariance and dispersal processes at different times in geological history. The first was during the formation of the Gulf of California, which occurred between 10 and 3 Ma ago (Murphy and Aguirre-León 2002), and the second was during the glaciation in the Pleistocene (García-Navarrete et al. 2024). However, an integrative approach is needed to clarify the phylogeographic relationships between *H. torquata* from Islas Marías Archipelago and the *Hypsiglena* species from the Gulf of California (Mulcahy and Macey 2009).

Based on the checklist available for the Islas Marías Archipelago (Casas-Andreu 1992; Woorrich-Piña et al. 2016; Nolasco-Luna et al. 2022; Loc-Barragán et al. 2024), and our records of *H. torquata* from María Madre Island, the herpetofaunal diversity of this island now includes 16 families, 24 genera, and 24 species. The herpetofauna is composed by four amphibians, *Incilius mazatlanensis* Taylor, 1940, *Smilisca baudinii* (Duméril & Bibron, 1841), *Eleutherodactylus pallidus* (Duellman, 1958), and *Hypopachus variolosus* (Cope, 1866); a turtle, *Kinosternon integrum* Le Conte, 1854; six lizards, *Phyllodactylus cleofasensis* Ramírez-Reyes, Barraza-Soltero, Nolasco-Luna, Flores-Villela & Escobedo-Galván, 2021, *Anolis nebulosus* (Wiegmann, 1834), *Ctenosaura pectinata* (Wiegmann, 1834), *Urosaurus ornatus* (Baird & Girard, 1852), *Aspidoscelis communis* (Cope, 1878), and *Hemidactylus frenatus* Duméril & Bibron, 1836; and 13 snakes, *Hypsiglena torquata*, *Masticophis lineatus* (Boucourt, 1890), *Lampropeltis polyzona* Cope, 1860, *Mastigodryas melanolomus* (Cope, 1868), *Oxybelis microphthalmus* Barbour & Amaral, 1926, *Tantilla calamarina* Günther, 1895, *Leptophis diplotropis* Günther, 1872, *Imantodes gemmistratus* (Cope, 1861), *Drymarchon melanurus* Duméril, Bibron & Duméril, 1854, *Geophis annuliferus* (Boulenger, 1824), *Agkistrodon bilineatus* Günther, 1863, *Boa sigma* (Smith, 1943), and *Rena humilis* (Baird & Girard, 1853). Of the 24 species, two species of amphibians and 10 reptiles are endemic to Mexico, and one species is endemic to the Islas Marías Archipelago. Twelve are found in some risk category for the Mexican authority (SEMARNAT NOM-059), eight species have Special

Protection, two species are classified as threatened, and two species are considered as endangered. Only *H. frenatus* is an exotic species. To date, only five species (*I. mazatlanensis*, *H. variolosus*, *G. annuliferus*, *K. integrum*, and *Hemidactylus frenatus*) occur on the María Madre Island, while the rest are shared with the other islands.

Our finding underscores the importance of continued biological surveys in insular ecosystems, not only to reveal previously undocumented species distributions but to enhance our understanding of biogeographical patterns only on the Gulf of California.

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ADDITIONAL INFORMATION

Conflict of interest

The authors declare that no competing interests exist.

Ethical statement

No ethical statement is reported.

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Author contributions

Conceptualization: JRN-L, AHE-G. Data curation: MR, AHE-G. Funding acquisition: AHE-G. Investigation: JRN-L, AHE-G. Methodology: MR, AHE-G. Resources: AHE-G. Supervision: AHE-G. Visualization: JRN-L, MR, AHE-G. Project administration: AHE-G. Validation: JRN-L, AHE-G. Writing – original draft: JRN-L. Writing – review and editing: JRN-L, MR, AHE-G.

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Data availability

All data that support the findings of this study are available in the main text.

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